REMARKS

Reconsideration and allowance of the above-referenced application are respectfully requested.

I. STATUS OF THE CLAIMS

Claims 2 and 7 are amended herein.

In view of the above, it is respectfully submitted that claims 2, 3, 5, and 7 are currently pending and under consideration in the present application.

II. REJECTION OF CLAIM 2 UNDER 35 U.S.C. § 103(A) AS BEING UNPATENTABLE OVER TERRY ET AL. (US 5,388,185) IN VIEW OF KANDEL ET AL. (US 6,353,671) AND FURTHER IN VIEW OF "SPEECH RECOGNITION SYSTEM", 1 SEPTEMBER 1970, IBM TECHNICAL DISCLOSURE BULLETIN, VOL. 13, ISSUE 4, PAGES 828-831 ("IBM")

In the previous response it was argued that Terry fails to disclose the claimed present invention's "a detector detecting a frequency band having a highest energy level among frequency bands comprising the acoustic signals input into the input unit," because Terry column 6, lines 50-55 discusses "Given the knowledge of the position of the first formant, this system can optionally remove or attenuate the first speech formant. This enables the relative energy in the second formant region to be increased thus increasing the prominence of the second formant." In other words, Terry only detects the first formant and the second formant, but the claimed present invention provides "detecting a frequency band having a highest energy level among frequency bands comprising the acoustic signals input into the input unit." In the Response to Arguments, the Examiner asserts Terry FIG. 2 discusses spectral analysis 42 and formant extraction 44. Thus, the Examiner appears to assert that Terry's spectral analysis 42 and formant extraction 44 impliedly discusses the claimed present invention's "detecting a frequency band having a highest energy level among frequency bands comprising the acoustic signals input into the input unit."

Applicant's respectfully disagree because although Terry FIG. 2 shows a spectral analysis 42 and a formant extraction 44, spectral analysis 42 is provided for formant extraction, but not for detecting level of energy of a frequency band. Further, even if Terry's spectral analysis 42 could possibly provide the capability of detecting energy level of frequency bands, Terry is silent on using the same to achieve the claimed present invention. In other words, the claimed present invention is not directed to spectral analysis and formant extraction per se, but the claimed present invention (see claim 2 as amended herein) expressly recites:

...

a detector detecting a frequency band having a highest energy level among frequency bands comprising the acoustic signals input into the input unit; and

a variable equalizer, which is able to amplify a limited frequency range and the limitation of the frequency range is variable, maintaining the energy level of the acoustic signals input into the input unit substantially at a constant level for frequency bands lower than the frequency band detected by the detector, and increasing the amplification degree of the energy level of the acoustic signals input into the input unit as the frequency increases for the frequency bands higher than the frequency band detected by the detector ...

Terry is silent on using its spectral analysis 42 to detect a highest energy level frequency band among input frequency bands, but Terry column 6, lines 41-45 only discusses using the spectral analysis 42 to "filter out any specified frequency region. This can be used to remove narrow band noise component." Terry fails to disclose or suggest to one skilled in the art to specify for the spectral analysis 42 to detect the claimed present invention's "a frequency band having a highest energy level among frequency bands," because Terry only uses the spectral analysis 42 to filter out a specified frequency region. In other words, Terry's spectral analysis 42 fails to provide "detecting a frequency band having a highest energy level among frequency bands," for purposes of "a variable equalizer, which is able to amplify a limited frequency range and the limitation of the frequency range is variable, maintaining the energy level of the acoustic signals input into the input unit substantially at a constant level for frequency bands lower than the frequency band detected by the detector, and increasing the amplification degree of the energy level of the acoustic signals input into the input unit as the frequency increases for the frequency bands higher than the frequency band detected by the detector."

Thus, Terry fails to suggest to one skilled in the art to use its spectral analysis 42 according the present invention as claimed.

The Office Action relies on Kandel to meet the claimed present invention's "variable equalizer ..." However, Kandel column 9, lines 5-13 only discloses a gain amplifier 114 to amplify a second formant. In the Response to Arguments, the Examiner asserts Kandel column 9, lines 5-13 discusses an equalizer with variable gain. The Examiner also asserts "the limitations of the frequency range being variable are not found in the claims." It is submitted that Kandel's gain amplifier 114 differs from the "variable equalizer" 7 (FIG. 3) of the claimed present invention, because the variable equalizer 7 equalizes, by maintaining or increasing, the energy level of frequency bands lower than the highest frequency band detected by the detector and frequency bands higher than the highest frequency band detected by the detector. In other

words, the claimed present invention's variable equalizer 7 equalizes the energy level in a frequency range lower and higher than a frequency band detected to have a highest energy level among input frequency bands. Kandel's amplifier 114 simply fails to disclose or suggest to one skilled in the art to modify the amplifier 114 to provide the claimed present invention, because Kandel only discusses amplifying one of the formant frequencies, namely, the second formant frequency, but the claimed present invention provides "a variable equalizer, which is able to amplify a limited frequency range and the limitation of the frequency range is variable, maintaining the energy level of the acoustic signals input into the input unit substantially at a constant level for frequency bands lower than the frequency band detected by the detector, and increasing the amplification degree of the energy level of the acoustic signals input into the input unit as the frequency increases for the frequency bands higher than the frequency band detected by the detector."

It is readily apparent that even if one combined Terry and Kandel, the combined system fails to disclose the claimed present invention. Further, a combination of Terry and Kandel fails to suggest to one skilled in the art to modify the combined system to provide the claimed present invention, because Terry only discusses filtering out a specified frequency region, but fails to discuss that "a frequency band having a highest energy level among frequency bands" can be detected for purpose of providing "a variable equalizer, which is able to amplify a limited frequency range and the limitation of the frequency range is variable, maintaining the energy level of the acoustic signals input into the input unit substantially at a constant level for frequency bands lower than the frequency band detected by the detector, and increasing the amplification degree of the energy level of the acoustic signals input into the input unit as the frequency increases for the frequency bands higher than the frequency band detected by the detector."

Also, Kandel discusses among a first and a second formant using a gain amplifier 114 to amplify the second formant only, but fails to discuss "a variable equalizer, which is able to amplify a limited frequency range and the limitation of the frequency range is variable, maintaining the energy level of the acoustic signals input into the input unit substantially at a constant level for frequency bands lower than the frequency band detected by the detector, and increasing the amplification degree of the energy level of the acoustic signals input into the input unit as the frequency increases for the frequency bands higher than the frequency band detected by the detector." In other words, Kandel fails to suggest to one skilled in the art to modify its gain amplifier 114 to operate across a plurality of frequency bands "lower than the frequency band detected by the detector" and "frequency bands higher than the frequency band detected by the detector."

The IBM reference teaches a speech recognition system, but fails to teach or suggest the claimed detector and variable equalizer.

A benefit of the claimed present invention is to provide, in circumstances where the masking range has been expanded, a superior correction characteristic based upon different sounds (the present Application page 11, lines 14-18). Further, because Terry and Kandel only focus on the first and second formants, they are effective to clarify only speech signals, while the claimed present invention can clarify the sound of, for example, music, bird's chirping, flow of river in addition to speech, because the claimed present invention's "variable equalizer" operates across a plurality of frequency bands "lower than the frequency band detected by the detector" and "frequency bands higher than the frequency band detected by the detector," as expressly claimed in the independent claims 2, 3 and 5.

Accordingly, a prima facie case of obviousness has not been established based upon Terry, Kandel, and IBM.

With regard to claim 3, the Examiner points out that "Kandel further discloses a circuit (122) which will inherently have a delay to the input acoustic signal to the amplifier (i.e. variable equalizer) 114." Though the circuit (122) may inherently have a delay, the circuit does not locate at an input side of the variable equalizer, and Kandel is silent that the delay time is corresponding to a response delay time unique to the variable equalizer.

Claim 7 depends from claim 3 and patentably distinguishes over the cited prior art for at least the same reasons as claim 3. Moreover, the meaning of "the response time of the variable equalizer" is the time speed to shift the frequency band for amplifying, which is detected by the detector. This time speed does not depend on the frequency. The Examiner appears to misunderstand the contents of claim 7. Thus, claim 7 is amended herein and recites, "wherein the response time of the variable equalizer is 5 msec or less when a high pass filter characteristic shifts to a high frequency side from the frequency band detected by the detector, and is 10 msec or less when the high pass filter characteristic shifts to a low frequency side from the frequency band detected by the detector."

In view of the above, it is respectfully submitted that the rejection is overcome.

III. REJECTION OF CLAIMS 2, 3, 5, AND 7 UNDER 35 U.S.C. §103(A) AS BEING UNPATENTABLE OVER KANDEL ET AL. (U.S. 6,353,671) IN VIEW OF IBM TECHNICAL DISCLOSURE BULLETIN (IBM)

The comments in section III above also apply here.

In view of the above, it is respectfully submitted that the rejection is overcome.

IV. CONCLUSION

In view of the foregoing amendments and remarks, it is respectfully submitted that each of the claims patentably distinguishes over the prior art, and therefore defines allowable subject matter. A prompt and favorable reconsideration of the rejection along with an indication of allowability of all pending claims are therefore respectfully requested.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,
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